or in the open-hearth furnace, will bo simply saturated with gases taking part in the process.

For the gases retained mechanically, on tho contrary, the relations are different. The chief constituent of the same is, as Kuhfuss' table shows, carbon monoxido gas, and this gas originates in the interior of the metal itself undor conditions which do not permit of its instantaneous exit from tho metal. The very minute gas bubbles formed must first unite themselves into large bubbles before they can escape. In order that this can happen, time must, bo allowed, and during the same the metal must be maintained liquid by means of high temperature.

Thus the conditions for tho production of a metal with low gas content become obviously tho most favourable if the termination of the gas formation be awaitecl in the furnace itself, i.c., if it be not tapped out until tho s(ato of equilibrium between the slag and metal has made its appearance. Reaction becomes slower and slower with approach to a state of equilibrium, and therefore) if one wishes to end tho "heat" under such conditions, one must sacrifice a certain time. But then, and indeed only then, it becomes possible to produce a metal which exhibits a minimum of tho mechanically retained gases, and which, on this account, up to setting in tho test would, also behaves quietly throughout. Metal with high carbon content also then solidifies quietly, whilst it appears like an effervescent liquid supersaturated with gases under a strongly oxidising slag.

((?) DKOXUUTWN.

In spite of the most painstaking observation of all precautionary measures, which are adapted to pnmmt an excess of oxygen in the slag, tho entry of oxygon into tho metal in not avoided, and almost always tho amount of tho same is so large that at least a portion thereof must bo removed. Thin is done by means of deoxidatkm, reducing agentn being added again to the bath.

Manganese has already boon pointed out to bo tho agent which reacts in the most favourable, wanner undor the, conditions ruling, and hence manganeses in generally used as a